

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER

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JC18 Rec'd PCT/PTO 02 JUL 2001
U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/869650

INTERNATIONAL APPLICATION NO.

PCT/SE99/02496

INTERNATIONAL FILING DATE

29 December 1999

PRIORITY DATE CLAIMED

30 December 1998

TITLE OF INVENTION

GAS-GENERATING MATERIAL FOR GAS-ACTUATED CAR SAFETY DEVICES

APPLICANT(S) FOR DO/EO/US

Sjoberg, Per

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. § 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the Annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter
16. ☒ Other items or information: ISR, IPER

09/869650

PCT/SE99/02496

0459/00346

JC19

JUL 2001

☒ The following fees are submitted:**Basic National Fee (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO.....\$860.00
International preliminary examination fee paid to USPTO (37 CFR 1.482)\$69

0.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)).....\$710.00

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$1,000.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4).....\$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$1000

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

Claims	Number Filed	Number Extra	Rate		
Total Claims	13- 20 =	0	X \$18.00	\$	
Independent Claims	1- 3 =	0	X \$80.00	\$	
Multiple dependent claim(s)(if applicable)			+ \$270.00	\$	

TOTAL OF ABOVE CALCULATIONS = \$1000

Reduction by 1/2 for filing by small entity, if applicable.

SUBTOTAL = \$1000

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

TOTAL NATIONAL FEE = \$1000

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

TOTAL FEES ENCLOSED = \$1000

Amount to be:	
refunded	\$
charged	\$

- a. ☒ A check in the amount of \$1000 to cover the above fees is enclosed.
b. ☐ Please charge my Deposit Account No. 22-0185 in the amount of \$_____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
c. ☒ The Director is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 22-0185. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status

SEND ALL CORRESPONDENCE TO:**Connolly Bove Lodge & Hutz LLP**

1990 M Street, N.W., Suite 800

Washington, DC 20036-3425

SIGNATURE

Burton A. Amernick

NAME

24.852

REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :
: Per Sjoberg :
Serial No.: To be assigned : Art Unit: To be assigned
Filed: Herewith : Examiner: To be assigned
For: GAS-GENERATING : Atty Docket: 0459/00346
MATERIAL FOR GAS- :
ACTUATED CAR SAFETY :
DEVICES :
:

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to initial examination, please amend the above-captioned case as follows.

IN THE CLAIMS

Please amend the claims as follows.

3. (Amended) Process according to Claim 1 for recovering the said chemicals, guanidine dinitramide and guanyl urea dinitramide, wherein this is done by low-temperature crystallization from water at various temperatures.
4. (Amended) Pyrotechnical gas-generating substances for gas-actuated car safety devices such as air bags, safety-belt tighteners, etc., made according to the process specified in Claim 1, wherein they contain guanidine dinitramide as the gas-forming substance.

6. (Amended) Pyrotechnical gas-generating substances according to Claim 4, wherein they comprise more than 50 wt-% of guanidine dinitramide.

7. (Amended) Pyrotechnical gas-generating substances according to Claim 4, wherein they are used in the form of pressed tablets, prepared possibly with a binder whose total amount does not exceed 10 wt-%.

Please add the following new claims.

8. (New) Process according to Claim 2 for recovering the said chemicals, guanidine dinitramide and guanyl urea dinitramide, wherein this is done by low-temperature crystallization from water at various temperatures.

9. (New) Pyrotechnical gas-generating substances for gas-actuated car safety devices such as air bags, safety-belt tighteners, etc., made according to the process specified in Claim 2, wherein they contain guanidine dinitramide as the gas-forming substance.

10. (New) Pyrotechnical gas-generating substances for gas-actuated car safety devices such as air bags, safety-belt tighteners, etc., made according to the process specified in Claim 3, wherein they contain guanidine dinitramide as the gas-forming substance.

11. (New) Pyrotechnical gas-generating substances according to Claim 5, wherein they comprise more than 50 wt-% of guanidine dinitramide.

12. (New) Pyrotechnical gas-generating substances according to Claim 5, wherein they are used in the form of pressed tablets, prepared possibly with a binder whose total amount does not exceed 10 wt-%.

13. (New) Pyrotechnical gas-generating substances according to Claim 6, wherein they are used in the form of pressed tablets, prepared possibly with a binder whose total amount does not exceed 10 wt-%.

REMARKS

The claims have been amended to eliminate multiple dependency and to improve their format. None of these amendments is believed to involve any new matter. Accordingly, it is respectfully requested that the foregoing amendments be entered, that the application as so amended receive an examination on the merits, and that the claims as now presented receive an early allowance.

Respectfully submitted,



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Date: 7-02-01

APPENDIX – MARKED UP VERSION

3. (Amended) Process according to Claim 1 [or 2] for recovering the said chemicals, guanidine dinitramide and guanyl urea dinitramide, [characterized in that] wherein this is done by low-temperature crystallization from water at various temperatures.

4. (Amended) Pyrotechnical gas-generating substances for gas-actuated car safety devices such as air bags, safety-belt tighteners, etc., made according to the process specified in [Claims 1-3, characterized in that] Claim 1, wherein they contain guanidine dinitramide as the gas-forming substance.

6. (Amended) Pyrotechnical gas-generating substances according to [Claims 4 and 5, characterized in that] Claim 4, wherein they comprise more than 50 wt-% of guanidine dinitramide.

7. (Amended) Pyrotechnical gas-generating substances according to [Claims 4-6, characterized in that] Claim 4, wherein they are used in the form of pressed tablets, prepared possibly with a binder whose total amount does not exceed 10 wt-%.

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Gas-generating material for gas-actuated
car safety devices

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The purpose of pyrotechnical gas-generating substances used in air-bag assemblies is to fill the fabric pouch of the air bag with a gas quickly, in order to provide a flexible protecting medium between the passenger and the equipment in the car. The pyrotechnical gas-generating substances and the gas formed by them must meet a number of requirements in order to ensure that the air-bag assembly works and is reliable, and that the environment is not harmed.

10 The same requirements are also placed on the pyrotechnical gas-generating substances used in other gas-actuated safety devices in cars, such as safety-belt tighteners, inflatable neck supports, etc.

Thus, the gas formed in all such car safety devices should not contain any hot solid particles that could burn through the main part of the system and set fire to the gas-filled fabric pouch and injure the passengers or jeopardize the entire operation of the safety device. Sodium azide, the most commonly used pyrotechnical gas-generating substance for this purpose nowadays, does not fully meet this requirement and must therefore be employed with specially reinforced fabric pouches to stop the movement of the solid particles formed in the combustion of sodium azide. The need for this extra reinforcement means that such a safety device is larger and weighs more than strictly needed for its operation.

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Furthermore, the environmental requirements placed on the pyrotechnical gas-generating substances used for the purpose in question stipulate that these substances must not form gaseous mixtures that contain poisonous gases in an amount that is harmful to health. The poisonous gases that are mainly relevant in this context because they are formed in the combustion of

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the gas-generating substances are nitrous compounds, NO_x and carbon monoxide. If the gas-generating substance contains chlorine, hydrochloric acid is also formed.

Furthermore, the pyrotechnical gas-generating substances used in a gas-actuated car safety device must have a high efficiency, i.e. they should form a large amount of gas per unit weight or volume of the gas-generating substance. However, the efficiency of sodium azide is not particularly high, since it only forms gas in an amount of about 40% of the solid substance. This low efficiency makes it difficult to meet the car manufacturers' requirement of car safety devices with a low weight and a small size when sodium azide is employed as a gas-generating substance.

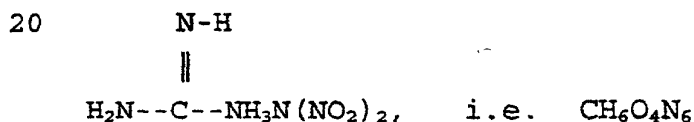
A further requirement placed on the said pyrotechnical gas-generating substances is that they should all be thermally stable in the sense that they should not be affected much by the high temperatures that can occur in the dashboard in countries with a warm climate. Nitrocellulose is an example of a substance that does not meet this requirement, but which would otherwise be suitable, and in fact it is used nowadays for this purpose, although it limits the service life of the said car safety devices.

In addition to the above requirements, the product used in car safety devices as a pyrotechnical gas-generating substance must also meet several requirements concerning its combustion characteristics if a fully satisfactory operation is to be ensured. Thus, the ideal pyrotechnical gas-generating substance in this connection should have a high rate of burning and one that does not vary much with the pressure or the temperature. Sodium azide is an ideal substance from this point of view, but it has several disadvantages, as mentioned above.

There is another group of substances that generate gases when combusted and which have been tried as gas-generators for car safety devices. This group comprises nitramine-based gunpowder compositions such

as RDX, which are used e.g. in a mixture with cellulose acetyl butyrate. However, the disadvantage of nitramine-based gunpowders is that their rate of burning depends on the pressure to a large extent. If the pressure is too low, the burning is completely extinguished, while if the pressure is too high, the combustion has an explosive course. According to US Patent No. 5,695,216, these disadvantages can be corrected by constructing a powerful container for the gas-forming substance and to equip the container with decompression means. However, even if this functions - and functions well, the construction still requires extra parts and costs more.

The present invention relates to the use of a pyrotechnical gas-generating substance that is completely new in the application under consideration, namely guanidine dinitramide, which has the following chemical formula and which can be easily prepared from guanidine and ammonium dinitramide.



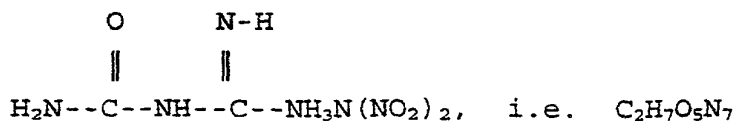
According to the invention, guanidine dinitramide can be advantageously used as a pyrotechnical gas-generating substance in gas-actuated car safety devices such as air bags, safety-belt tighteners, inflatable neck supports, etc. For this purpose, the guanidine dinitramide is employed either in the pure form or in a mixture with other gas-releasing or oxygen-releasing substances, such as for example guanyl urea dinitramide, which can modify the burning rate and the rate of gas evolution of the main substance according to each special requirement.

As mentioned before, the present invention also relates to the mixing of guanidine dinitramide with other substances in order to obtain a mixture whose burning characteristics are optimal for the application in question.

An essential advantage of guanidine dinitramide and of mixtures in which it features as the main component is that these substances contain both oxidizers and a fuel. They are therefore in principle of the type of single-component gunpowder, which does not need any other substance for combustion or has access to atmospheric oxygen.

Pure guanidine dinitramide burns very fast even at a low pressure, and its combustion is not very pressure-dependent, the pressure exponent being about 0.75. At atmospheric pressure, guanidine dinitramide burns faster than nitrocellulose and almost as fast as sodium azide. A significant advantage over sodium azide is, furthermore, that guanidine dinitramide does not form any solid combustion products but is instead fully converted into gases on combustion. This means in turn that, when guanidine dinitramide is used as the gas-generating substance in air-bag assemblies, no extra reinforcement is needed for the gas pouches in order to prevent the substance from burning through them. This fact enables the designers of such car safety devices to reduce the weight and size of the latter without jeopardizing their operation. Moreover, guanidine dinitramide only contains one carbon atom, so that advantageously little carbon monoxide is formed in its combustion. In addition, guanidine dinitramide has an ideal thermal stability, with a melting point in excess of 130°C and a decomposition temperature of over 160°C,

As mentioned before, the rate of burning of guanidine dinitramide, and therefore of course the rate of gas-formation, can be modified by admixing other gas-generating or oxygen-releasing substances to it. A specially suitable additive that can be used in this connection is guanyl urea dinitramide, which has the following chemical formula.



Guanyl urea dinitramide is relatively easy to prepare from guanyl urea by reacting it with ammonium dinitramide. Pure guanyl urea dinitramide burns much less fast than guanidine dinitramide, so that it is not all that suitable for use by itself as a gas-generating substance in car safety devices, at least in certain applications. Furthermore, guanyl urea dinitramide contains an additional carbon atom, so that its combustion gases contain too much carbon monoxide when this compound is used as the main gas-generating substance. On the other hand, its combustion is stable even at a low pressure, besides being fairly independent of the pressure and the temperature. Furthermore, guanyl urea dinitramide also burns without forming any solid particles. In addition, it is thermally stable, with a melting point of over 160°C, and its decomposition does not start until 180°C is reached. Its lower rate of burning and its chemical similarity to guanidine dinitramide make it particularly useful as a combustion modifier for regulating the rate of burning of a mixture of these two substances. Mixing these compounds has therefore made it possible to prepare gas-generating materials with a suitable rate of burning for each particular application.

Mixtures of guanidine dinitramide and guanyl urea dinitramide burn with so little smoke that there is no risk of confusing the release of an air-bag assembly with the beginning of a fire in the car, which has sometimes happened before with the previous types of air-bag assemblies, such as those using azides as gas-generating substances.

Both guanidine dinitramide and guanyl urea dinitramide can be pressed into tablets with a good mechanical strength whether they are used singly or in mixtures with each other. This means that both pure guanidine dinitramide and its mixtures with guanyl urea dinitramide are suitable for use in most applications

in the form of pressed tablets. If required, a small amount - preferably not more than 10 wt-% - of a binder may be added to confer an even better mechanical strength on the pressed tablets.

5 The substances according to the invention have the further advantage that, when they finish their service life as potential gas-generating substances in a car safety device, which hopefully has not seen active use, they can be simply recovered for re-use as gas-
10 generating substances in a similar or a different product.

When preparing new chemicals nowadays, it is essential to bear in mind, for environmental reasons, how they can be recovered and recycled. Yet none of
15 the materials used nowadays as gas-forming substances in car safety devices can be recovered in a simple manner when they have come to the end of their service life without active use. Besides, as these car safety devices are products that preferably should not see
20 active use, it can be expected that the number of unused units of such gas-generators that will have to be collected after the vehicles equipped with them are scrapped will increase at the rate at which these safety devices are installed in new cars.

25 Sodium azide, which is nowadays used in car safety devices on a large scale, is in fact always employed in a mixture comprising Fe_2O_3 and silicates, and no effective way of re-using these substances is known today. Furthermore, sodium azide is very toxic, which
30 is another reason why there is no other possibility than to destroy it as soon as possible when the car safety device incorporating it has reached the end of its service life. Similarly, nitrocellulose cannot be re-used either, because it is unstable and decomposes
35 in the course of time. The only practical method of destroying nitrocellulose collected from scrapped products is therefore exactly the same as in the case of sodium azide, i.e. incineration.

By contrast, guanidine dinitramide and guanyl urea dinitramide are uniform and stable products that can furthermore be easily recrystallized. If, despite everything, they undergo decomposition to some extent, they can still be recycled after recrystallization. The fact is that this process removes any decomposition products, and so the recrystallized compound is entirely comparable with the newly produced one. A further advantage is that these two compounds can be recrystallized from water without the use of solvents. This possibility of recovering and recycling the gas-generating substances from scrapped car safety devices of the kind considered here has of course significant environmental benefits in comparison with the currently customary azides and nitrocellulose gunpowders, which must always be destroyed by incineration.

Guanidine dinitramide itself is moderately soluble in water at room temperature and is not hygroscopic, whereas guanyl urea dinitramide is fairly insoluble in cold water but moderately soluble in warm water. Both compounds can therefore be recrystallized from water at a low temperature. This is a particularly simple and cheap process, which should make it possible to recover and re-use the gas-generating substances from scrapped but non-deployed air-bag assemblies and similar other pyrotechnically actuated car safety devices.

The various aspects of the invention are specified in the claims, and the attached diagram shows how the rate of burning varies with the combustion pressure in the case of various mixtures of the two compounds in question.

This diagram was constructed on the basis of experimental values obtained as follows. In the case of each mixture, the same amount of sample in the form of pressed tablets was combusted in a hermetically sealed combustion bomb, together with a standard amount of auxiliary gunpowder used as an aid and a pressure-raising additive. The pressure inside the combustion bomb was measured with a manometer, and the rate of

burning was determined from the curves obtained for the change in pressure. The experimental values obtained were used to construct the curves shown in the diagram.

The letters A and B in this diagram refer to
5 guanyl urea dinitramide and guanidine dinitramide,
respectively, and the amounts of both are given in the
diagram.

CLAIMS

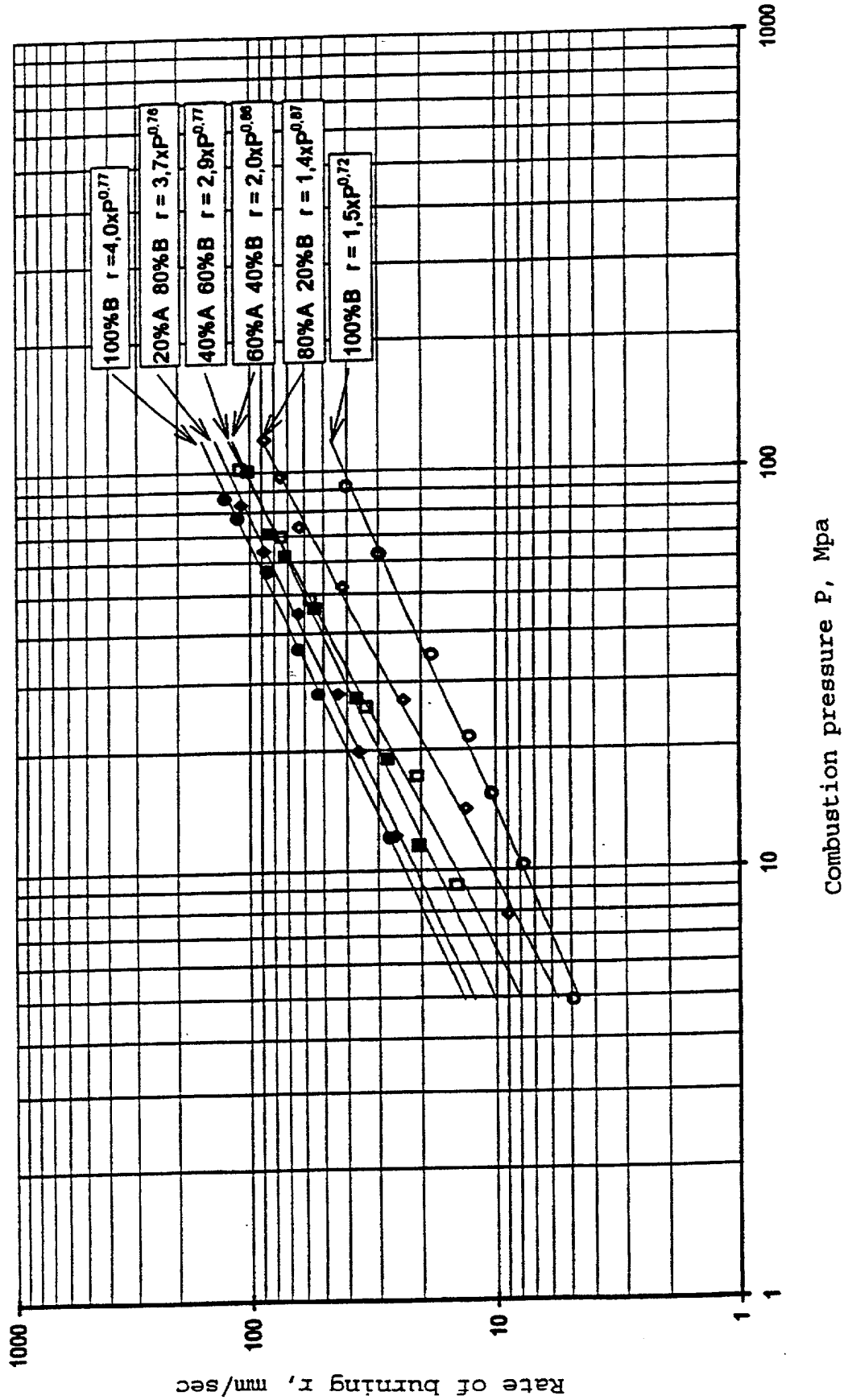
- 5 1. Process for the preparation of gas-actuated car
safety devices of the type of air bags, safety-belt
tighteners, inflatable neck supports and similar
devices, from which the chemicals used as gas-
generating substances can be recovered, if the device
10 has not seen active use, after removing the car safety
device from its original position when its normal
service life has expired, characterized in that a
pyrotechnical material comprising guanidine
dinitramide, which can be recrystallized from water, is
15 used as a gas-releasing substance in these car safety
devices.
2. Process according to Claim 1 for making car safety
devices whose chemical substances can be recovered
after their normal service life is finished,
20 characterized in that the gas-releasing material is
guanidine dinitramide, whose rate of burning is
adjusted to the required value by admixing a suitable
amount of guanyl urea dinitramide to it.
3. Process according to Claim 1 or 2 for recovering
25 the said chemicals, guanidine dinitramide and guanyl
urea dinitramide, characterized in that this is done by
low-temperature crystallization from water at various
temperatures.
4. Pyrotechnical gas-generating substances for gas-
30 actuated car safety devices such as air bags, safety-
belt tighteners, etc., made according to the process
specified in Claims 1-3, characterized in that they
contain guanidine dinitramide as the gas-forming
substance.
- 35 5. Pyrotechnical gas-generating substances according
to Claim 4, characterized in that their main component
is guanidine dinitramide, whose rate of burning is
regulated to obtain the required value by admixing a
suitable amount of guanyl urea dinitramide.

- 10 -

6. Pyrotechnical gas-generating substances according to Claims 4 and 5, **characterized in that** they comprise more than 50 wt-% of guanidine dinitramide.

7. Pyrotechnical gas-generating substances according
5 to Claims 4-6, characterized in that they are used in
the form of pressed tablets, prepared possibly with a
binder whose total amount does not exceed 10 wt-%.

Rate of burning as a function of the
combustion pressure in the case of mixtures of
substances A and B



DECLARATION FOR PATENT APPLICATION

0459/00346

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Gas-generating material for gas-actuated car safety devices

the specification of which: (check one)

☐ is attached hereto. ☒ was filed on December 29, 1999, as United States Patent Application Serial No. or PCT International Application Number PCT/SE99/02496, and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37CFR § 1.56(a).

Prior Foreign Application(s): I hereby claim foreign priority benefits under 35U.S.C. § 119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate listed below, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Priority Claimed

9804611-3	Sweden	30/December/1998	{xx}	[]
(Application No.)	(Country)	(Day/Month/Year Filed)	YES	NO
_____	_____	_____	[]	[]
(Application No.)	(Country)	(Day/Month/Year Filed)	YES	NO
_____	_____	_____	[]	[]
(Application No.)	(Country)	(Day/Month/Year Filed)	YES	NO

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Application No.

Filing Date

I hereby claim the benefit under 35U.S.C. § 120 of any United States application(s) listed below or 34 U.S.C. § 365(c) of any PCT International Application designating the United States of America listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application or PCT application in the manner provided by 35U.S.C. § 112, first paragraph, I acknowledge the duty to disclose material information as defined in 37 CFR § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(U.S. or PCT Application Serial No.)	(U.S. or PCT Filing Date)	(Status - patented, pending, abandoned)
_____	_____	_____
(U.S. or PCT Application Serial No.)	(U.S. or PCT Filing Date)	(Status - patented, pending, abandoned)
_____	_____	_____

I hereby appoint the following registered practitioners: Rudolf E. Hutz, Reg. No. 22,397; John D. Fairchild, Reg. No. 19,756; Harold Pezzner, Reg. No. 22,112; Richard M. Beck, Reg. No. 22,580; Paul E. Crawford, Reg. No. 24,397; Burton A. Amernick, Reg. No. 24,852; Morris Liss, Reg. No. 24,510; George R. Pettit, Reg. No. 27,369; Patricia Smink Rogowski, Reg. No. 33,791; Robert G. McMorro, Jr., Reg. No. 30,962; Ashley I. Pezzner, Reg. No. 35,646; William E. McShane, Reg. No. 32,707; Mary W. Bourke, Reg. No. 30,982; Gerard M. O'Rourke, Reg. No. 39,794; James M. Olsen, Reg. No. 40,408; Francis DiGiovanni, Reg. No. 37,310; Eric J. Evain, Reg. No. 42,517; William E. Curry, Reg. No. 43,572; Daniel C. Mulveny, Reg. No. 45,897; John A. Evans, (Agent) 44,100; and Elliot C. Mendelson (Agent), Reg. No. 42,878, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Send Correspondence and Direct Telephone Calls to:

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(202) 331-7111Burton A. Amernick «MATTER RESPATY»
Connolly Bove Lodge & Hutz LLP
P.O. Box 19088
Washington, D.C. 20036-0088 U.S.A.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Per Sjöberg

Inventor's Signature

Residence Address

Citizenship

Post Office Address

Date August 17, 2001

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Sweden

Same as above

[] See next page for additional inventors